

Pteridophytic Flora of Kodaikanal

BY

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INTRODUCTION

Matthew (1959) and Gupta (1960, 1962) have given a comprehensive account of the Angiospermic Flora of Kodaikanal situated on Palni Hills in south India. Detailed information is not available about the Pteridophytic Flora of this region. Only scanty information about the Ferns of Palni Hills is found in Beddome's (1863, 1864, 1865?) 'Ferns of Southern India' wherein the author had enumerated 24 species in all. As far as the 'Fern Allies' are concerned, Chowdhury (1937) and Alston (1945) have given some information. However, detailed account about the altitudinal distribution and ecology of different species of ferns and fern-allies is lacking. Therefore, in the absence of any authoritative taxonomic account of the Pteridophytic Flora of Kodaikanal, the present work was taken up.

Kodaikanal, a beautiful health resort of south India is located at about 10°14' N., 77°28' E. with an average altitude of about 2,100 m.

The present observations concerning the Pteridophytic Flora are largely based on the collections made during June, 1962 and September to November, 1966.

AREAS EXPLORED

The area explored in and around Kodaikanal is very extensive. Intensive collections were made in the dense forest areas falling within an altitudinal range of 300-2400 m. Each locality was visited several times so as to make a complete note of the habitats of different species and also about their frequency of occurrence. Frequently visited forests around Kodaikanal include Levinge (2100 m.), Shembaganur (1950 m.) and Perumal Malai (1500 m.). Excursions on foot were taken to all the places of picnic interest, namely, Coaker's Walk (2100 m.), Observatory Hill (2200 m.), Pillar Rocks (2200 m.), Bear Shola Falls (2100 m.), Silver Cascade (1700 m.), Parvat Vihar (1250 m.), Perumal Peak (1800 m.) and Fairy Falls (2000 m.). The sampling of high altitude vegetation was done around Moir Point (2300 m.) and Berijam Lake

(2400 m.) along Cochin road. These excursions were extended to lower altitude areas such as Falls View (500 m.), Vellagevi village (600 m.), Kavanji (700 m.), Uttu (900 m.), Tanikkudi (800 m.) and Periyakulam (300 m.).

ECOLOGICAL NOTES ON PTERIDOPHYTES

Kodaikanal is very rich in Pteridophytes and the members constitute a conspicuous element of the flora. Thick forests around Shembaganur, Silver Cascade, Perumal Malai and Bear shola are particularly very rich in ferns. Most of these are either ground-growing or lithophytic but several of them grow as epiphytes as well, usually on angiospermic trees and very few on conifers. The epiphytes mainly belong to fern family Polypodiaceae. Members of Aspidiaceae, Thelypteridaceae, Pteridaceae and Athyriaceae are largely terrestrial.

The Pteridophytes collected from the area, can be described under following altitudinal zones :

Species growing up to 600 m. altitude :

At lower altitudes *Lygodium flexuosum* (L.) Sw. grows on the forest floor and with the help of the twining rachis it climbs on the neighbouring bushes. *Ampelopteris prolifera* (Retz.) Copel. and *Microsorium punctatum* (Linn.) Copel. flourish very well at the foot of the hills. About 600 m. altitude *Adiantum lunulatum* Burm. grows prolifically in moist situations. The exposed rocks and dry boulders are largely inhabited by *Hemionitis arifolia* (Burm.) Moore and *Actiniopteris radiata* (Sw.) Link. *Adiantum incisum* Forsk. flourishes extremely well *en route* Falls view and Cooly ghat in open spaces.

Species growing between 600-1200 m. altitude :

Blechnum orientale Linn. prefers sunny situations on calcareous soil along Uttu-Parvat Vihar road and near Vellagavi village. *Adiantum incisum* Forsk. and *Actiniopteris radiata* (Sw.) Link are common everywhere up to 1000 m. altitude. *Selaginella radicata* (Hook. & Grev.) Spreng., *Cheilanthes mysurensis* Wall. ex Bedd., *Asplenium falcatum* Lam. var. *bipinnatum* Sledge, *Polystichum amabile* (Bl.) J. Smith and *Asplenium varians* Hook. & Grev. are exceedingly common on rocks near Panakaddu. *Pyrrosia lanceolata* (L.) Farwell colonizes several exposed rocks near Falls view and Cooly ghat. Occasionally it also grows epiphytically on tree trunks. On the forest floor near Shembaganur there is abundant growth of *Adiantum hispidulum* Sw. One of the most common ferns of this zone is *Hemionitis arifolia* (Burm.) Moore.

Species growing between 1200-2000 m. altitude :

The maximum number of species grow in this zone. Amongst the ferns met with along water channels in shola near Perumal Malai or Parvat Vihar, in Shembaganur forest and near Silver Cascade may be mentioned *Diplazium maximum* (Don) C. Chr., *D. latifolium* (Don) Moore, *D. polypodioides* Blume, *D. muricatum* (Mett.) V.A.V.R., *Thelypteris repens* (Hope) Ching, *Cyathea gigantea* (Wall. ex Hook.) Holttum, *Cyathea nilgirensis* Holttum, *Marattia fraxinea* Smith, *Angiopteris evecta* (Forst.) Hoffm. and *Microlepia trapeziformis* (Roxb.) Kuhn.

On clay soil in ravines, *Diplaziopsis javanica* (Bl.) C. Chr. is met with, while *Diplazium esculentum* (Retz.) Sw. prefers moist but rather open situations.

The epiphytes are very conspicuous. *Vittaria elongata* Swartz, *Loxogramme lanceolata* Presl and *Asplenium ensiforme* Wall. ex Hook. & Grev. are seen on the middle or basal portions of the tree trunks. Occasionally *Selaginella involvens* (Sw.) Spr. which normally grows on rocks is found as an epiphyte. The commonest epiphytic ferns around Kodaikanal within this altitudinal range are *Antrophyum plantagineum* (Cav.) Klf., *Asplenium auritum* Sw., *Loxogramme involuta* (Don) Presl, *Pyrrosia mollis* (Kze.) Ching, *Lepisorus nudus* (Hook.) Ching, and *Ctenopteris subfalcata* (Bl.) Kunze. Several individuals of *Nephrolepis cordifolia* (Linn.) Presl were seen growing on a palm tree, *Borassus flabellifer* Linn. near Shembaganur. Several of the epiphytic species may also grow lithophytically.

Among the ferns which prefer shaded moist rocks may be mentioned *Adiantum capillus-veneris* Linn., *A. cuneatum* Langsd & Fisch., *A. aethiopicum* Linn., *Mecodium javanicum* (Spr.) Copel. *Lindsaya cultrata* (Willd.) Swartz, *Sphenomeris chinensis* (Linn.) Maxon, *Araiostegia pulchra* (Don) Copel., *Leucostegia immersa* (Wall.) Presl, *Nephrolepis cordifolia* (Linn.) Presl, *Oleandra wallichii* (Hook.) Presl, *Polystichum auriculatum* (L.) Pr., *Elaphoglossum laurifolium* (Thouars) Moore, *Arachniodes speciosa* (Don) Ching, *Elaphoglossum petiolatum* (Sw.) Urban, *Athyrium japonicum* (Thbg.) Copel., *A. anisopterum* Christ., *Cyclosorus dentatus* (Forsk.) Ching, *Asplenium unilaterale* Lamk., *A. tenuifolium* Don, and *A. ensiforme* Wall. ex Hook. & Grev.

Lycopodium cernuum Linn., *Adiantum incisum* Forsk., *Cheilanthes chrysophylla* Hook., *C. mysurensis* Wall. ex Bedd., *Pellaea geraniaefolia* Fée, and *Pityrogramma chrysophylla* (Sw.) Link, grow in exposed situations under xeric conditions either on rock boulders or gravelly soil, all along roadside between Perumal Malai-Parvat Vihar.

Dicranopteris linearis (Burm.) Underwood, forms huge green thickets along roadside especially near Silver Cascade. *Pteridium aquilinum* (L.) Kuhn, is a weedy species and grows in open spaces along roadside

or forest paths. In similar situations *Botrychium lanuginosum* Wall. grows in abundance near Tiger shola.

Several ferns as *Microlepia platyphylla* (Don) J. Smith, *Hypolepis punctata* (Thbg.) Mett., *Dryopteris atrata* (Wall.) Ching, *Diplazium polyodioides* Blume, and *Pteris quadriaurita* Retz., often inhabit forest floor and forest fringes near Shembaganur and Silver Cascade.

Species met with above 2000 m. altitude :

At higher elevations the epiphytic growth in the open places or hill tops gradually decreases. Most of the epiphytic species recorded from this zone grow in the shola near Moir Point where enough of humus is available on the tree trunks. The common species are *Asplenium indicum* Sledge, *Lepisorus amaurolepida* (Sledge) Bir & Trikha (comb. nov.)¹, *Phymatodes hastata* (Thunb.) Ching, *Microsorium membranaceum* (Don) Ching, *Loxogramme involuta* (Don) Presl and *Pleopeltis macrocarpa* (Bory ex Willd.) Kaulf. which hang downwards from lower portions of tree trunks. Occasionally *Athyrium puncticaule* (Bl.) Moore, *Asplenium erectum* Bory ex Willd., and *Asplenium aethiopicum* (Burm.) Bech., which are normally lithophytic or terrestrial species, also grow on the trunks in Bombay Shola and Bear Shola falls. *Mecodium exsertum* (Wall. ex Hook.) Copel. is a rare epiphyte.

The species which colonize moist and shaded rocks in this zone are *Adiantum cuneatum* Langsd. & Fisch., *Mecodium polyanthos* (Sw.) Copel., *Polystichum aculeatum* (L.) Schott, *P. auriculatum* (L.) Pr., *Dryopteris odontoloma* (Moore) C. Chr., *D. sparsa* (Don) O. Kuntze, *Athyrium japonicum* (Thbg.) Copel., *A. pectinatum* (Wall.) Presl, *A. puncticaule* (Bl.) Moore, *Thelypteris brunnea* (Wall.) Ching, *Cyclosorus dentatus* (Forsk.) *Leptogramme totta* J. Smith. Ching, *Asplenium normale* Don, *A. cheilosorum* Kunze, *A. trichomanes* Linn., *A. erectum* Bory ex Willd., *A. zenkeranum* Kze. Linn., *A. affine* Sw., *Loxogramme involuta* (Don) Presl, etc.

At about 2100 m. *Pteridium aquilinum* (L.) Kuhn grows in extensive beds in open spaces to form an extremely prolific vegetation even obliterating the normal footpaths. Occasionally *Cyathea crinita* (Hook.) Copel. ascends higher up to about 2200 metres and grows in forest near Pillar Rocks. Often *Pteris quadriaurita* Retz., *Polystichum auriculatum* (L.) Pr., *Arachniodes aristata* (Forst. f.) Tindale, *Dryopteris wallichiana* (Spreng.) Hyl., *D. atrata* (Wall.) Ching, and *Asplenium aethiopicum* (Burm.) Bech., grow along the forest fringes.

Amongst the higher altitude ferns, *Cheilanthes chrysophylla* Hook. thrives well in exposed rock crevices near Observatory. Two club mosses, namely, *Lycopodium cernuum* Linn. and *L. clavatum* Linn. grow

¹Basinym : *Pleopeltis amaurolepida* Sledge in Bull. Brit. Mus. (nat. Hist.) 2 (5) : 136, 1960.

on calcareous soil along roads at about 2400 m. altitude near Berijam Lake. Several species such as *Botrychium daucifolium* Wall., *B. lanuginosum* Wall., *Lycopodium wightianum* Wall., *Ophioglossum petiolatum* Hook. and *Osmunda regalis* Linn. grow in open grass lands near Pillar Rocks and Moir Point.

ENUMERATION OF THE GENERA AND SPECIES

The arrangement of families and genera is mainly based on the scheme proposed by Mehra (1961) and later on adopted by Mehra & Bir (1964). In our opinion taking into consideration the gross morphological characters, *Pteridium* Scopoli and *Nephrolepis* Schott belong to family Pteridaceae and Davalliaceae respectively rather than the former genus to family Hypolepidaceae and the latter genus to family Oleandraceae as earlier placed by Mehra & Bir (loc. cit.). Some species of *Selaginella* and *Lycopodium* recorded from Kodaikanal by Alston (1945) and Chowdhury (1937) respectively have also been included so as to compile a comprehensive account. The species included on the basis of earlier published data, are marked with an asterisk(*).

In case of ferns only references have been made to Clarke's (1880) 'A Review of Ferns of Northern India' (F.N.I.), Beddome's (1863, 1864, 1865 ?) 'Ferns of Southern India' (F.S.I.), and Beddome's (1883, 1892) 'A Handbook to the Ferns of British India, Ceylon and Malaya Peninsula' (Handb.). Species mentioned in Mehra and Bir's account of 'Pteridophytic flora of Darjeeling and Sikkim Himalayas are cited as Mehra & Bir, 1964 wherein complete information is provided for basynyms and common synonyms. Therefore, in case of such species references to Clarke's and Beddome's works or other literature are omitted. Further, full reference to the original publication of the specific name is given only in case of those species that are not included in Christensen's 'Index Filicum' with Supplements I-III (1905-1906, 1913, 1917, 1934) and Pichi-Sermolli's Index Filicum Supplementum Quartum (1965).

Voucher specimens are placed in the Herbarium of the Punjabi University, Chandigarh, India and reference to the herbarium number/s of each species collected from Kodaikanal is given within parenthesis after distribution.

FERN ALLIES

Family PSILOTACEAE

Psilotum triquetrum Swartz; *P. nudum* (L.) Griseb. ; Clarke, F.N.I. 589.1880.

Grows on rocks in the Botanical garden of Sacred Heart College, Shembaganur. It is extremely rare and was not seen anywhere else.

Family EUISETACEAE

Equisetum debile Roxb. ex Vaucher ; Mehra & Bir 99, 1964.

Cultivated in the Botanical garden of Sacred Heart College, Shembaganur. It may possibly be found at lower altitudes.

Family SELAGINELLACEAE

Selaginella involvens (Sw.) Spr. ; Mehra & Bir 100, 1964.

It grows on calcareous soil along road side or as lithophyte on big rocks at moist places in forests. Extremely common on forest floor between 1500-1800 m, especially near Silver Cascade (1800 m.), Shembaganur (1950 m.) and Perumal Malai (1500 m.). It also grows epiphytically on trees in shola below Perumal Malai (1500 m.). (4710-4712, 5712-5715).

S. radicata (Hook. & Grev.) Spring

Met with at low levels between 900-1200 m. altitude growing luxuriantly on roadside slopes. It is common in the Panakaddu area (1300 m.). (5710, 5711).

**S. cataractarum* Alston

Collected from rock near Silver Cascade (1680 m.) and Pambar stream by Munch (cf. Alston 1945, p. 228).

Family LYCOPODIACEAE

Lycopodium wightianum Wall.

Extremely common in open grassy spaces between 1950-2250 m. altitude especially in Pillar Rocks area (2300 m.) and near Holiday Home (2100 m.). (4497-4500, 5718, 5719).

L. setaceum Hamilt. ; Mehra & Bir 101, 1964.

One of the commonest epiphytes in Tiger Shola (1700 m.) near Silver Cascade. The plants are beautifully pendulous from tree branches. It may also occur on moist rocks. It was not seen in any other locality. (5720, 5721).

L. hamiltonii Spreng. ex Hook. & Grev. ; Mehra & Bir 101, 1964.

Cultivated in the Botanical garden of Sacred Heart College, Shembaganur (200 m.). It is very rare. Also recorded by Chowdhury (1937) from Kodaikanal. (5716).

L. cernuum Linn. ; Mehra & Bir 102, 1964.

Grows on calcareous soil along the roadside slopes near Perumal Malai (1400 m.) and Berijam Lake (2200 m.). It is common between 1300-2300 m. altitude. (5724, 5725).

L. clavatum Linn. ; Mehra & Bir 102, 1964.

It is extremely rare. It was collected only once growing on calcareous soil along the road slopes near Berijam Lake (2200 m.). (5722, 5723).

L. phlegmaria Linn. ; Mehra & Bir 102, 1964.

Collected from the Botanical garden of Sacred Heart College, Shembaganur (2000 m.). It is extremely rare. Also recorded from Bear Shola (cf. Chowdhury 1937). (5717).

L. serratum Thunberg ; Mehra & Bir 101, 1964.

Collected by Iyengar from Bear shola (2100-2400 m. altitude) (cf. Chowdhury, loc. cit.).

L. complanatum Linn. ; Clarke, F.N.I. 593, 1880.

According to Chowdhury (loc. cit.) this species was collected by Levinge from Kodaikanal, 2100 m.

L. phyllanthum Hook. & Arn.

It was collected by Iyengar from Kodaikanal, 2100 m. (cf. Chowdhury loc. cit.).

FERNS

I. OPHIOGLOSSACEOUS SERIES

Family OPHIOGLOSSACEAE

Ophioglossum petiolatum Hook. ; Mehra & Bir 103, 1964.

Grows in the meadows near Pillar Rocks (2100 m.). The plants are rare, small-sized and rather inconspicuous. These are usually overshadowed by grass. Extremely rare. (4870).

Botrychium lanuginosum Wall. ; Mehra & Bir 102, 1964.

Extremely common in the open grassy places all over between 1600-2100 m. altitude. Collected from Tiger Shola near Silver Cascade (1600 m.) and from Levinge Forest (2000 m.). (4477, 4780, 5728, 5729).

B. daucifolium Wall. ex Hook. & Grev. ; Clarke, F.N.I. 587, 1880 ; Bedd., Handb. 469, t. 294, 1892. *Botrychium subcarnosum* Wall. ; F.S.I.t. 68, 1863.

Quite abundant in Levinge Forest (2000 m.) and grows in rather exposed places. Not seen anywhere else. (5726, 5727).

II. MARATTIACEOUS SERIES

Family MARATTIACEAE

Marattia fraxinea Smith ; Bedd., F.S.I.t. 79, 1863 & Handb. 460, t. 286, 1883.

Grows near water in Shembaganur forest (1800 m.). Extremely rare. (4473, 5732, 5733).

Angiopteris evecta (Forst.) Hoffm. ; Mehra & Bir 103, 1964.

It is a large-sized fern and is occasionally met with near water in the ravines and flourishes very well at low altitudes especially in Perumal Malai area (1400 m.). (4785, 4786, 5730, 5731).

III. OSMUNDACEOUS SERIES

Family OSMUNDACEAE

Osmunda regalis Linn.; Clarke, F.N.I. 583, 1880 ; Bedd., Handb. 450, 1883.

This is a high altitude fern and flourishes near water channel in Holiday Home (2000 m.) and also in open meadows *en route* Moir Point (2250 m.). (4474, 4475).

IV. SCHIZAEACEOUS SERIES

Family SCHIZAEACEAE

Lygodium flexuosum (L.) Sw. ; Mehra & Bir 104, 1964.

It grows frequently at lower altitudes between 300-600 m. and sometimes covers adjacent small bushes in forests *en route* Kodaikanal (600 m.). (4688, 4689, 4781, 4782).

Family ADIANTACEAE

Adiantum capillus-veneris Linn. ; Mehra & Bir 105, 1964.

Grows at relatively lower altitudes (below 1800 m.) on moist and shady rocks especially along streams in Shembaganur forest (1,500 m.) and is locally abundant. (4779).

A. lunulatum Burm. ; Mehra & Bir 105, 1964.

It is a low level fern, never ascending above 1350 m. and grows in moist situations along motor road to Kodaikanal (600 m.). (4828).

A. cuneatum Langsd. & Fisch. ; Mehra & Bir 105, 1964.

Common on moist rocks along Coaker's Walk (2100 m.), possibly an escape from cultivation. Also it is extremely common at damp places between 1600-2100 m. altitude. (4507-4510, 5739-5740).

A. incisum Forsk. ; Mehra & Bir 105, 1964.

One of the commonest species at lower levels flourishing in rather exposed situations near Perumal Malai (750 m.), Shembaganur forest (900 m.) and near Falls View (200 m.). It is frequently met with along roadsides from 1000 m. downwards. (5734, 5735).

A. aethiopicum Linn. ; Bedd. ; F.S.I.t.5, 1863 & Handb. 84, 1883.

It is a low level fern found between 800-1000 m. altitude. It covers rocks along roadside and especially near Uttu (900 m.). (5738, 5739 a).

A. hispidulum Sw. ; Bedd., F.S.I.t.3, 1863 & Handb. 86, 1883.

It mostly covers moist shaded rocks between 600-1000 m. especially near Uttu (800 m.), and Shembaganur forest (1000 m.). This fern is exceedingly common in moist situations on the forest floor *en route* Periyakulam. (5736, 5737).

Family VITTARIACEAE

Vittaria elongata Swartz ; Mehra & Bir 106, 1964.

It grows as an epiphyte and is often pendulous from the tree trunks in Tiger Shola (1700 m.) near Silver Cascade in moist dark situations. The fronds often have a grass-like appearance. It is a very rare species and was collected only once. (4813, 5741, 5742).

Family ANTROPHYCEAE

Antrophyum plantagineum (Cav.) Klf. ; Mehra & Bir 107, 1964.

It is common between 1000-1500 m. altitude, usually growing on moist rocks or tree trunks in Sholas especially in Tiger Shola (1500 m.) and in shola near Perumal Malai (1000 m.). (5743-5746).

Family SINOPTERIDACEAE

Cheilanthes chrysophylla Hook. ; Mehra & Bir 109, 1964.

This fern is common in dry rock crevices near Perumal Malai (about 1200 m.) and Observatory (2200 m.). The stipes are scaly throughout. Bright golden-yellow powder is present on the underside of the laminæ. The outline of the frond is similar to that of the typical *C. farinosa* but much smaller in size. (4818, 4819, 5765, 5766).

C. mysurensis Wall. ex Bedd., F.S.I.t. 190, 1864 & Handb. 89, t.46, 1883.

It grows in dry rock crevices all along Uttu-Perumal Malai road (700-1000 m.) and is quite common between 600-1200 m. altitude. (4520, 5763, 5764).

Pellaea geraniaefolia F'ee ; *Pellaea concolor* Bak. ; Bedd., Handb. 100, t. 52, 1883. *Pteris geraniaefolia* Raddi ; Bedd., F.S.I.t. 37, 1863.

It is a low level fern, common between 1000-1400 m. altitude and grows on dry rocks near Perumal Malai (1300 m.) and Uttu (1100 m.). Also grows epiphytically near Parvat Vihar (1200 m.). (5767, 5768).

Family GYMNOGRAMMACEAE

Hemionitis arifolia (Burm.) Moore ; Bedd., Handb. 413, t. 245, 1883.

Hemionitis cordata Hook. & Grev. ; Bedd., F.S.I.t. 53, 1863.

This low altitude fern is extremely common between 600-1200 m. and it grows on dry exposed rocks in open sunny places all along the road between Falls View and Perumal Malai (500-1300 m.). (5747, 5748).

Pityrogramma chrysophylla (Sw.) Link ; *Ceropteris chrysophylla* Link.

It is met with in rather exposed places on calcareous soil at low levels along Perumal Malai-Parvat Vihar road. It is quite common between 1000-1450 m. Bright yellow powder is present on the underside of the lamina. (5749, 5750).

Family PTERIDACEAE

Pteris quadriaurita Retz. ; Mehra & Bir 113, 1964.

Extremely common between 1500-2000 m. altitude. It grows in open spaces along roadsides or in meadows and is common near Silver Cascade (1700 m.) and along Coaker's Walk (2000 m.). Individuals growing in open situations have stunted growth. (4527-4529, 4687, 5772, 5774, 5775).

Actiniopteris radiata (Sw.) Link ; Bedd., F.S.I. t. 124, 1864. *Actiniopteris dichotoma* Kuhn ; Clarke, F.N.I. 505, 1880 ; Bedd., Handb. 197, t. 98, 1883.

This is a fern of low levels and is frequently met with along Uttu-Falls View road in dry exposed rocks between 500-1000 m. altitude. (5769-5770).

Pteridium aquilinum (L.) Kuhn ex Deck. ; Mehra & Bir 118, 1964.

It is one of the commonest ferns in open grassy places all over between 1200-2300 m. especially abundant near Coaker's Walk (2100 m.), Moir's Point (2300 m.), Pillar Rocks (2200 m.), Holiday Home (1950 m.), Shembaganur Forest (1800 m.) and Perumal Malai (1400 m.). It grows on sunny grassy hill sides and is often very large and gregarious. (4513, 5771, 5773).

V. HYMENOPHYLLACEOUS SERIES

Family HYMENOPHYLLACEAE

Mecodium javanicum (Spr.) Copel. ; Mehra & Bir 115, 1964.

This rare fern grows on moist shaded rocks along Shembaganur foot-path (1800 m.). Rhizome widely creeping and stipe and rachis broadly winged. (4788).

M. exsertum (Wall. ex Hook.) Copel. ; Mehra & Bir 115, 1964.

Quite rare, epiphytic on the lower part of the tree trunk. Collected from near Pillar Rocks (2200 m.). (4789).

M. polyanthos (Sw.) Copel. ; Mehra & Bir 115, 1964.

It grows on moist dark rock near Coaker's Walk (2250 m.) and is extremely rare. Fertile fronds are infrequently found. (4799).

Family DENNSTAEDTIACEAE

Microlepia trapeziformis (Roxb.) Kuhn ; Mehra & Bir 117, 1964.

M. polypodioides Bedd., F.S.I.t.15, 1863.

This species flourishes very well as forest undergrowth near Perumal Malai (1400 m.) and Shembaganur (1900 m.) in shaded and damp situations. It is rather rare in the area. (5776, 5772).

M. platyphylla (Don) J. Smith ; Mehra & Bir 118, 1964.

This low altitude fern is of large size and grows in abundance on the forest floor near Shembaganur (1200 m.) and in shola near Parvat Vihar (1100 m.). (5778-5779).

Family HYPOLEPIDACEAE

Hypolepis punctata (Thbg.) Mett. ; Mehra & Bir 118, 1964.

It prefers open situations and is common near Lake (2000 m.), Shembaganur (1800 m.) and Silver Cascade (1700 m.). It is found

in large populations because of widely creeping and branching nature of the rhizome. (4472, 5759, 5760).

Family LINDSAYACEAE

Lindsaya cultrata (Willd.) Swartz ; Mehra & Bir 118, 1964.

It is extremely common and grows gregariously on rocks or stone walls near water or in moist situations between 1600-2000 m. especially along Kodaikanal-Perumal Malai road, Shembaganur Forest (1900 m.) and Silver Cascade (1800 m.). (4501, 4502, 4976, 5782, 5783).

Sphenomeris chinensis (Linn.) Maxon ; Mehra & Bir 119, 1964.

It is abundant on moist rocks between 1600-2000 m. altitude especially near Lake (2000 m.) and Silver Cascade (1800 m.) (4468-4471, 5780-5781).

Family DAVALLIACEAE

Araiostegia pulchra (Don) Copel ; Mehra & Bir 119, 1964.

Extremely common on moist rocks in Tiger Shola near Silver Cascade (1800 m.) and in Shembaganur forest (1600 m.). Usually grows between 1500-1800 m. altitude and is rare at higher elevations. (5785, 5785a)

Leucostegia immersa (Wall.) Presl ; Mehra & Bir 120, 1964.

It grows abundantly on moist shaded rocks in Shola near Perumal Malai, 1500 m. altitude. Quite rare elsewhere, collected only once. (4811, 4812, 5788, 5789).

Davallia bullata Wall. ex. Hook. ; Bedd., F.S.I.t.17, 1863 & Handb. 61, t. 31, 1883 ; Clarke, F.N.I. 445, 1880.

Cultivated in the Botanical garden of Sacred Heart College, Shembaganur.

Nephrolepis cordifolia (Linn.) Presl ; Mehra & Bir 121, 1964.

This is a low level fern and grows lithophytically. It is quite common up to 1900 m. altitude particularly near Shembaganur (1900 m.), Silver Cascade (1800 m.), Perumal Malai (1500 m.) and along Shembaganur-Perumal Malai road. Quite often it is met with as an epiphyte on the tree ferns and other trees along Kodaikanal road. The special character is the presence of underground tubers which help in perennation. Wherever it grows, it forms extensive populations. (5786, 5787, 5790, 5791).

N. exaltata (Linn.) Schott ; Bedd., F.S.I.t.93, 1863 & Handb. 282, 1883.

This is again a low altitude species and is extremely common along roadside in exposed situations. It is quite abundant around Perumal Malai (1500 m.) *en route* Thevenkariar (1300 m.) and near Parvat Vihar (1200 m.). (5949, 5950).

Family OLEANDRACEAE

Oleandra wallichii (Hook.) Presl ; Mehra & Bir 121, 1964.

It grows on moist rocks in shola near Silver Cascade (1700 m.). An entire rock was covered with this fern. The roots are long and wiry and the fronds are simple and soft. These possess sori in a single row on each side of and close to the midrib. It is extremely rare in other areas. (5792, 5793).

VI. GLEICHENIACEOUS SERIES

Family GLEICHENIACEAE

Dicranopteris linearis (Burm.) Underwood ; Mehra & Bir 122, 1964.

This fern forms huge thickets along roadside in exposed, sunny places and covers extensive areas on dry barren hill sides around Kodaikanal between 1700-2000 m. altitude. Especially met with near Silver Cascade (1750 m.), Shembaganur forest (1900 m.) and Lake (2000 m.). (4511, 4512, 4796-4798, 5794, 5795).

Family CYATHEACEAE

Holttum (1965) construed *Cyathea* Smith so as to include *Alsophila* R.Br., *Hemitelia* R.Br., *Gymnosphaera* Bl. and *Schizocaena* J. Smith. According to him the earlier distinctions of Baker, Beddome and Clarke on the basis of indusial characters of *Hemitelia* and *Alsophila*, are not natural ones. Taking into consideration the stipe-scales, the comprehensive genus *Cyathea* is divided by Holttum (loc. cit.) into two subgenera, namely, *Cyathea* and *Sphaeropteris*.

The subgenus *Cyathea* as described by Holttum, is characterised by flabelloid stipe-scales consisting of a median band of elongate thick-walled cells, with fragile margins of shorter thin-walled cells and bearing rather long flexuous thick-walled setae. It is further subdivided into two sections as *Cyathea* and *Gymnosphaera*. In the former section the sori are indusiate, indusium sometimes hidden by mature sorus and the latter section is characterised by sori without indusia. It may be mentioned

that *Cyathea spinulosa* Wall. ex Hook. and *C. nilgirensis* Holttum belong to section *Cyathea* whereas *Cyathea gigantea* (Wall. ex Hook.) Holttum belongs to section *Gymnosphaera*.

The subgenus *Sphaeropteris* to which *Cyathea crinita* (Hook.) Copel. belongs is recognised by setiferous stipe-scales consisting entirely of uniform elongate cells with regular short, oblique dark or concolorous setae along the edges.

Cyathea nilgirensis Holttum¹; *Alsophila latebrosa* Wall. ex Hook., pro parte quoad Bedd., Handb. 11, 1883. *A. latebrosa* Wall. ex Hook. var. *schmidiana* Kunze.

Extremely common in all the forests between 1600-2000 m. and is especially abundant around Silver Cascade (1800 m.) and in Tiger Shola (1700 m.), Shembaganur forest (1900 m.) and Lake area (2000 m.) near water. It is a lofty tree fern. The costae and costules of the pinnules characteristically possess bullate scales. The primary and secondary rachises are often muricated. (4521-4526, 5757, 5758).

The south Indian specimens referable to *Cyathea latebrosa* (Wall. ex Hook.) Copel. (= *Alsophila latebrosa* Wall. ex Hook.) belong to this species (cf. Holttum 1965).

C. spinulosa Wall. ex Hook.; Bedd., F.S.I. t.57, 1863; Handb. 6, 1883; Suppl. 2, 1892; Clarke, F.N.I. 429, 1880.

It is met with in south India at 600-900 m. (cf. Holttum, loc. cit.). It is possible that this species may also be growing in the forests around Kodaikanal though the writers have not collected it.

C. gigantea (Wall. ex Hook.) Holttum; *Alsophila gigantea* Wall. ex Hook.; *A. glabra* sensu Bedd., F.S.I. t. 60, 1863 & Handb. 14, 1883; Hook. & Bak., Syn. Fil. 43, 1874 (pro parte); Clarke, F.N.I. 433, 1880.

This tree fern is abundant at low altitude especially in ravines or at moist places. It was collected from Shola near Perumal Malai en route Thevenkariar (1400 m.). (5755, 5756).

C. crinita (Hook.) Copel.; *Alsophila crinita* Hook.; Bedd., F.S.I. t. 59, 1863 & Handb. 16, t. 6, 1883.

A large-sized tree fern, occasionally grows between 1800-2000 m. altitude, especially abundant in Shembaganur forest (1900 m.) and near Pillar Rocks (2200 m.). It is far less common than *Cyathea nilgirensis* Holttum. It has also been cultivated in Bruton Garden near Lake (2000 m.) (5753, 5754).

¹ Kew Bull., 19 (3): 468, 1965.

Family ASPIDIACEAE

Polystichum aculeatum (L.) Schott ; Mehra & Bir 127, 1964. Occasionally met with at higher altitude, generally in rock crevices. Collected from near Bombay Shola (2100 m.). (4689, 4699, 4884-4886, 5862, 5863).

P. amabile (Bl.) J. Sm. ; *Lastrea amabilis* Moore ; Bedd., F.S.I.t. 109, 1863 & Handb. 228, 1883.

It is a low altitude fern, growing on moist rocks near Uttu (1000 m.). Rhizome is characteristically creeping and the surfaces of pinnae are shining. This fern is quite rare and only a few specimens were collected. (5860, 5861).

P. auriculatum (L.) Pr. ; Bedd., F.S.I. t. 120, 1863 & Handb. 203, t. 102, 1883.

Met with at moist places or on shaded moist rocks between 1600-2100 m. in all forests especially in Shembaganur forest (1900 m.), forest near Bombay Shola (2100 m.) and Silver Cascade (1700 m.). The stipes are densely paleaceous. It was also seen, growing epiphytically on tree trunks in forest near Bombay Shola (2100 m.). (4515, 4517).

Arachniodes aristata (Forst. f.) Tindale ; Mehra & Bir 128, 1964.

It is a large-sized fern with densely paleaceous stipes and is common in open and damp places all over between 1600-2000 m. altitude especially near Bear Shola Falls (2000 m.), Bombay Shola (2100 m.) and Shembaganur forest (1900 m.). A few specimens were seen growing epiphytically on tree trunks in Levinge forest. (4696, 4697, 5846, 5847).

A. speciosa (Don) Ching ; Mehra & Bir 129, 1964.

Often met with in Shembaganur forest (1900 m.). Also common along Perumal Malai-Thevenkariar old path (1400 m.). Pinnae are shining. (5844, 5845).

Cyrtomium caryotideum Presl ; Mehra & Bir 129, 1964.

Cultivated in the Botanical garden of Sacred Heart College, Shembaganur (1900 m.). It was not collected in wild state.

Elaphoglossum laurifolium (Thouars) Moore ; Bedd., F.S.I.t. 200, 1864 ; Mehra & Bir 130, 1964. *E. latifolium* sensu Bedd., Handb. 416, t. 248. 1883.

It grows on moist shaded rocks and was collected only from one place near Bear Shola (2000 m.). Fronds are dimorphic. This species

is characterised by the fact that the margin of the frond is hyaline chartaceous. (5840, 5841).

E. petiolatum (Sw.) Urban ; *E. viscosum* Schott ; Bedd., F.S.I. t. 196, 1864 & Handb. 420, t. 250, 1883.

Collected only once near Perumal Malai (1500 m.) growing on moist shaded rocks. It is locally abundant. Fertile fronds are extremely rare. (5842, 5843).

E. conforme (Sw.) Schott ; Mehra & Bir 130, 1964.

Epiphytic on the lower part of tree trunk at moist shaded and protected places. It is extremely rare and was collected only once in forest near Moir Point (1800 m.). (4814, 4815).

Dryopteris ramosa (Hope) C. Chr. ; *Nephrodium ramosum* Hope.

This is a high altitude fern common near Coaker's Walk (2000 m.), Shembaganur (1950 m.) and Tiger Shola (1800 m.). It grows on calcareous soil. (5855, 5856).

D. marginata (Wall.) Christ ; Mehra & Bir 133, 1964.

It is a quite common fern between 1500-2000 m. and is generally found in valleys or wooded ravines. Abundant at Silver Cascade (1700 m.), Observatory Hill (2000 m.) and below Bombay Shola (2100 m.). (4693, 4483-4485, 5857, 5858).

D. wallichiana (Spreng.) Hyl¹. *Dryopteris paleacaea* (Don) Hand.—Mazz. ; Mehra & Bir 131, 1964.

Rhizome is ascending and the stipes are densely clothed with dark brown scales. This is a high altitude fern and is very common near Coaker's Walk (2100 m.), Holiday Home (2150 m.), Pillar Rocks (2200 m.) and Moir's Point (2300 m.). It grows on calcareous soil. (4690, 4691, 5850-5852).

D. odontoloma (Moore) C. Chr. ; Mehra & Bir 132, 1964.

This fern is found in and around Kodaikanal in partially shaded situations at higher altitudes especially abundant in Shembaganur forest (1900 m.), near Observatory (2100 m.) and near Bear Shola (2000 m.). (4478-4482, 5848-5849).

D. sparsa (Don) O. Kuntz ; Mehra & Bir 133, 1964.

It is quite frequently met with between 1500-2100 m. especially near Silver Cascade, Observatory Hill and in forest near Shembaganur. (4486-4489, 4692, 5853, 5854).

¹ For details of Synonymy see Alston (1957), Alston & Bonner (1956) and Nair (1968),

D. atrata (Wall.) Ching ; Mehra & Bir 130, 1964.

It is quite common between 1600-2200 m. and is especially met with on the forest floor near Shembaganur (1900 m.), Silver Cascade (1800 m.) Bombay Shola (2000 m.) and is abundant along Silver Cascade-Perumal Malai road. Once one was seen growing epiphytically on tree trunk in Shembaganur forest. (5859).

Family ATHYRIACEAE

Athyrium japonicum (Thbg.) Copel. ; Mehra & Bir 144, 1964.

Extremely common at moist places between 1500-2100 m. altitude. It is locally abundant on forest floor in damp shaded situations near Silver Cascade (1700 m.). In similar situations it was seen near Bryant Park (2000 m.). The stipes and the lamina are more densely hairy as compared to the Himalayan examples. These plants have often been described under *Diplazium lasiopteris* Kze. (4680-4682, 5800, 5803).

A. anisopterum Christ ; Mehra & Bir 143, 1964.

It is extremely common on moist shaded rocks between 1600-2100 m. particularly at Silver Cascade (1700 m.) and near Pillar Rocks (2100 m.). (4683).

A. pectinatum (Wall.) Presl ; Mehra & Bir 141, 1964.

It grows in rather moist situations between 1200-2100 m. altitude, common near Silver Cascade (1600 m.) and near Lake (2100 m.). (4790).

A. puncticaule (Bl.) Moore ; Mehra & Bir 143, 1964. *A. macrocarpum* (Bl.) Bedd., F.S.I.t. 153, 1964.

It is locally abundant on moist rocks near Silver Cascade (1800 m.), in Shembaganur forest (1900 m.) and Levinge Forest (2100 m.). (4791, 4809, 4810, 5796, 5797).

A. praetermissum Sledge¹ ; *A. nigripes* sensu Bedd., F.S.I. 52, t. 157, 1864 & Handb. 166, 1883, pro parte ; non T. Moore.

Very rare, only few plants were seen growing in damp shaded situations in Tiger Shola (1800 m.). (5798, 5799).

A. solenopteris (Kunze) T. Moore var. *solenopteris* Sledge¹.

Rhizome ascending or decumbent ; stipes upto 20 cm. long ; lamina broadly lanceolate, 30 cm. × 15 cm. ; pinnae ascending, middle ones the

¹ For nomenclature see Sledge (1956, 1962).

largest, about 3 cm. apart, up to 10×3 cm., with narrowly winged rachis; pinnules well spaced with somewhat decurrent base.

Extremely common at high altitudes around Observatory (2200 m.). The densely crowded fronds give a characteristic appearance. (5939).

A. solenopteris (Kunze) T. Moore *var. pusillum* (Kunze) T. Moore.

Fronds small, about 20×10 cm. (including 5 cm. long scaly stipe); lamina narrow, 4-10 cm. wide; pinnae patent, lower ones often deflexed, crowded, lower ones $1-1\frac{1}{2}$ cm. wide apart, $4 \times 1\frac{1}{2}$ cm.; pinnules small, approximate, inciso-serrate or often shallowly pinnatifid.

Common between 1700-2100 m. throughout, often growing in extensive beds, near Bombay Shola (2100 m.), Observatory Hill (2200 m.) and near Lake (2000 m.). (5940).

Athyrium sp.

This is a high-altitude fern, flourishing abundantly in crevices of boulders near Lake (2100 m.).

Some of the specimens have morphology between *Athyrium solenopteris* (Kunze) T. Moore and *Athyrium praetermissum* Sledge and cannot be with certainty referred to either of the species. (5801-5802).

Diplazium esculentum (Retz.) Sw.; Mehra & Bir 148, 1964.

It is met with in damp situations especially along water channels and was collected in the forest *en route* Kodaikanal, 7th mile stone (1400 m.) It is a rather rare fern. Rhizome is wide creeping so that it covers large area. (4803, 4804).

D. polypodioides Blume; Mehra & Bir 146, 1964.

This large sized fern, often giving an impression of a 'tree fern' from a distance, grows between 1000-2100 m. altitudes and is usually found in ravines along water courses. Often it also grows on the forest fringes. It is abundant near Shembaganur *en route* Periyakulam (1000 m.) and in Shola near Parvat Vihar (1300 m.). (4700, 4805, 5826, 5827).

D. latifolium (Don). Moore; *Asplenium latifolium* Don (1825), non Bory (1803); *D. indicum* Nair¹ (Moore's name is legitimate).

Grows on forest floor, *en route* Kodaikanal near Silver Cascade (1500 m.). It is usually found in damp situations. Rhizome ascending, stipes sparsely scaly below, naked above. (4806).

D. maximum (Don) C. Chr.; Mehra & Bir 147, 1964.

It is rather a rare fern and was collected only once as growing in damp situations near water in shola near Perumal Malai.

¹ Indian Forester, 94 : 169, 1968, ...

D. muricatum (Mett.) V. A. V. R. ; Mehra & Bir 148, 1964. *Athyrium gymnogrammoides* Bedd., F.S.I.52, t. 156, 1864, pro parte, quoad descr. & fig. ; Handb. 168, 1883. *A. australe* sensu Bedd., F.S.I. 52, t. 158, 1864. *Asplenium procerum* (Hook. & Bak.) Wall. ex Clarke, F.N.I. 495, 1880.

It is one of the commonest ferns of ravines in all the forests between 1600-2200 m. and grows in moist situations. Collected from Picnic Shola (2200 m.) and from forest near Bombay Shola (2100 m.). (5941, 5942).

Diplaziopsis javanica (Bl.) C. Chr. ; Mehra & Bir 149, 1964.

Only once collected from forest near Shembaganur, 1650 m. altitude as growing along water channel on clay soil. (4792, 4793).

Family THELYPTERIDACEAE

Thelypteris repens (Hope) Ching ; Mehra & Bir 149, 1964.

This is a high altitude fern and flourishes well in rather moist situations. Common on forest floor near Coaker's Walk (2200 m.) and generally grows in extensive beds near water. (5838, 5839).

T. xylodes (Kunze) Ching ; Mehra & Bir 150, 1964.

It grows in abundance near lake (2100 m.) and near Observatory (2200 m.) and flourishes very well in rather moist situations. Abundant between 1600-2100 m. altitude. (4492, 4493, 5836, 5837).

T. brunnea (Wall.) Ching ; Mehra & Bir 151, 1964.

It often grows near water or in damp situations all round between 1700-2200 m. altitude. Especially abundant near lake (2100 m.), Holiday Home (2200 m.) and Observatory (2300 m.). (4495, 4496, 5832, 5833).

T. erubescens (Wall. ex Hook.) Ching ; Mehra & Bir 152, 1964.

Common on forest floor or on moist shady places near Silver Cascade (1800 m.). Also met with along Bombay Shola and near Holiday Home. (4491, 4494).

T. beddomei (Baker) Ching ; *Nephrodium beddomei* Baker. *Lastrea beddomei* (Baker) Bedd., Handb. 239, 1883. *Lastrea gracilescens* Bedd., F.S.I.t. 110, 1863 (non Moore 1858, nec. Hook. 1857).

It grows in rather moist situations and is occasionally met with along road sides in open spaces at Observatory Hill (2100 m.). Rhizome is shortly creeping. Stipe and lamina are throughout hairy. (4709).

Leptogramme totta J. Smith ; Mehra & Bir 153, 1964.

It is a very rare fern and was collected only once growing on moist shaded rocks in a ravine near Bear Shola at an altitude of 2100 m. (4490, 5828, 5829).

Ampelopteris prolifera (Retz.) Copel. ; *Polypodium proliferum* Roxb. ; Clarke, F.N.I. 548, 1880. *Goniopteris prolifera* Presl ; Bedd., Handb. 296, t. 153, 1883.

It is a low altitude fern. Collected only once in forest *en route* Kodaikanal (450 m.). This fern is often rooting by apical bud. (4708, 4783, 4784).

Cyclosorus dentatus (Forsk.) Ching ; Mehra & Bir 154, 1964.

It is exceedingly common between 1300-2000 m. altitude along Uttu-Shembaganur road and is found at moist places generally in the open or along water courses especially in Shembaganur forest (1950 m.) and near Silver Cascade (1800 m.). (4701-4707, 5834, 5845).

C. parasiticus (L.) Farwell ; Mehra & Bir 155, 1964.

It is met with at low altitudes along Perumal Malai-Parvat Vihar road (1300 m.) and grows in rather dry and exposed situations. (5830, 5831).

C. gongilodes (Schkuhr) Link (*gongylodes*) ; *Dryopteris gongilodes* (Schkuhr) O. Ktze.

var. *hirsutus* (Mett.) Farwell ; *Nephrodium unitum* R.Br. ; Bedd., F.S.I. t. 88.

1863. *Dryopteris gongylodes* var. *propinqua* (R.Br.) C. Chr.

Extremely common on Uttu-Silver Cascade road between 1000-1800 m. It is quite abundant near Silver Cascade (1800 m.) and grows on gravelly soil. (5945, 5946).

C. arbusculus (Willd.) Ching ; *Dryopteris arbuscula* (Willd.) O. Ktze. *Nephrodium arbuscula* (Willd.) Desv. ; Bedd., F.S.I. t. 87. 1863.

This is a low altitude fern around Perumal Malai (1200 m.). It is rare and grows on calcareous soil near water channel. The fern is densely hairy underneath and the entire lower surface is covered with sori. (5947, 5948).

Family ASPLENIACEAE

Asplenium ensiforme Wall. ex Hook. & Grev. ; *A. ensiforme* Wall. (nomen nudum) ; Bedd., F.S.I.t. 125, 1864 & Handb. 141, t. 71, 1883 ; Clarke, F.N.I. 476, 1880.

Only one plant was observed as growing on shaded rock near streamlet in khud below Silver Cascade (1200 m.). (4802).

A. normale Don ; Mehra & Bir 156, 1964.

It grows on moist shaded dark rocks all around between 1600-2100 m. altitude especially near Bear Shola (2100 m.), Shembaganur (1900 m.) and Pillar Rocks (2200 m.). Apical vegetative buds are present on the lamina. The auricle of the pinna is very much pronounced as compared to the Himalayan specimens. (4476, 5807, 5808).

A. indicum Sledge¹ ; *Asplenium planicaule* Wall. ; Bedd., F.S.I.t. 139, 1864.

It is rather a rare fern, collected from near Moir Point (1800 m.). It is locally abundant on tree trunks in the shola near Moir Point (1800 m.). (4674).

A. cheilosorum Kunze ; Mehra & Bir 157, 1964.

It is a fern of moist shaded rocks and flourishes in protected places. It is a rare fern in the area having been collected only once near Pillar Rocks (2100 m.). (4829, 4830).

A. unilaterale Lam. ; *Asplenium resectum* J. Smith ; Bedd., F.S.I.t. 132, 1864.

It is one of the commonest species growing luxuriantly on moist shaded dark rocks in Shembaganur forest (1900 m.) and near Pillar Rocks (2200 m.). (5824, 5825).

A. unilaterale Lam. var. **rivale** Bedd. (Handb. 153, 1883).

Some plants were found growing on dark dripping rocks in Shembaganur forest (1900 m.) and also few individuals were seen near Pillar Rocks (2200 m.). (5822, 5823).

A. varians Hook. & Grev. ; Mehra & Bir 158, 1964.

This is a rare low altitude fern and grows on moist shaded rocks along Panakaddu-Uttu road (1200-1300 m.). (4795, 5816, 5817).

A. tenuifolium Don ; Mehra & Bir 158, 1964.

Collected only once from shola below Shembaganur (1900 m.). It grows on moist shaded rocks at protected places and is locally abundant. (4800, 4801, 5818, 5819).

A. nidus Linn. ; Mehra & Bir 158, 1964. *Thamnopteris nidus* Presl ; Bedd., Handb. 137, 1883.

Cultivated in the Botanical garden of Sacred Heart College, Shembaganur (1950 m.). (5821).

¹ Bull. Brit. Mus. (nat. Hist.), 3 (6) : 264, 1965.

A. trichomanes Linn. ; Clarke, F.N.I. 477, 1880 ; Bedd., Handb. 143, 1883.

Some plants were found growing on a dark shaded rock along roadside near Moir Point (1800 m.). It is a rare fern and was collected only at one place. (4787).

A. inaequilaterale Willd. ; *Asplenium trapeziforme* sensu Bedd., F.S.I. 45, t. 134, 1864 ; non Roxb. *A. lunulatum* var. *trapeziforme* Bedd., Handb. 148, 1883, pro parte (non *A. trapeziforme* Roxb.).

It is a rare and low altitude fern. It grows in crevices of moist, dark rocks near Parvat Vihar (1200 m.). (5943, 5944).

A. erectum Bory ex Willd. ; *Asplenium brasiliense* sensu Bedd., F.S.I. 45, t. 135, 1864 ; non Raddi. *A. lunulatum* var. *camptorhachis* (Kunze) Bedd., Handb. 148, 1883.

This is occasionally met with as an epiphyte or lithophyte between 1600-2300 m. altitude, especially common in forest below Shembaganur (1900 m.), near Bear Shola (2100 m.) and at Moir Point. (4677, 4678, 5805, 5806).

A. zenkerinum Kunze ; Bedd., Hand. 148, t. 75, 1883 (*zenkerianum*). *Asplenium persicifolium* Sensu Bedd., F.S.I. t. 128, 1864.

It is an high altitude fern flourishing in the crevices of moist shady rocks and boulders in Picnic Shola (2000 m.) and near Pillar Rocks (2200 m.). Apical vegetative buds are frequently present. (4504, 4506, 5814, 5815).

A. decrescens Kunze ; *Asplenium contiguum* sensu T. Moore, Index Fil., 121, 1859 quoad specim. Zeyl. ; ? non Kaulf. ; Bedd., F.S.I. 47, t. 140, 1864. *A. caudatum* sensu Hook., Sp. Fil., 3 : 152, 1860 quoad specim. Zeyl., pro parte ; non Forst. f ; Bedd., Handb. 151, 1883.

This species prefers moist shaded dark rocks and luxuriantly flourishes in protected places. It is quite abundant between 1500-2300 m. altitude especially common in Shembaganur (1950 m.) and in forest below Silver Cascade (1700 m.). (5820).

A. affine Swartz

This large sized fern is quite rare in the area and grows in the crevices of moist shaded rocks near Pillar Rocks (2100 m.). (4670). For nomenclature of this as well as following species consult Sledge (1965).

A. aethiopicum (Burm. f.) Becherer ; *Asplenium furcatum* Thunb. ; Bedd., Handb. 157, 1883. *A. laserpitiifolium* sensu Bedd., F.S.I. 75, t. 225, 1864 ; non Lam.

It is extremely common on moist rocks, along footpaths and

occasionally grows epiphytically on lower portions of tree trunks between 1400-2300 m. and is abundant in forests near Observatory (2300 m.), Shembaganur (1800 m.), Tiger Shola (1800 m.) and Silver Cascade. (4716-4718, 5810, 5811).

A. falcatum Lam. var. **bipinnatum** Sledge¹. *Asplenium spathulinum* sensu Bedd., F.S.I. 75, t. 226, 1864 ; non J. Smith ex Hook.

It is rare fern and only few plants were collected as growing on shaded rock near Uttu (1100 m.) along Uttu-Falls View road. (5804, 5809).

A. auritum Swartz ; Bedd., F.S.I. t. 137, 1864 & Handb. 149, 1883.

It is occasionally met with as an epiphyte or on moist shady rocks around Silver Cascade (1800 m.), Moir Point (2200 m.), Tiger Shola (1700 m.) and in forest near Shembaganur (1950 m.). (5812, 5813).

A. caudatum Forst ; Bedd. ; F.S.I. t. 143, 1864.

It is often met with on moist shady rocks or stony walls between 1600-2300 m. especially near Pillar Rocks (2200 m.), Moir Point (2300 m.), Shembaganur (1900 m.), Silver Cascade (1800 m.) and Perumal Malai (1500 m.). (4671-4673, 4765).

Family BLECHNACEAE

Blechnum orientale Linn. ; Mehra & Bir 160, 1964.

It is extremely rare fern and grows in open sunny places usually in the crevices of rocks along Uttu road (950 m.) and near Vellagavi village (700 m.) (5761, 5762).

Family LOXOGRAMMACEAE

Loxogramme involuta (Don) Presl ; Mehra & Bir 160, 1964.

It is an epiphytic or a rock-loving fern and is common in all the forests between 1600-2400 m. altitude. Abundant near Observatory Hill (2300 m.), Moir Point (2200 m.), Pillar Rocks (2100 m.), Bear Shola (2000 m.), Tiger Shola (1800 m.) and in Shembaganur forest (1950 m.). (4807, 4808, 5751, 5752).

L. lanceolata Presl ; Mehra & Bir 161, 1964.

This is an extremely rare fern and was collected only once as an epiphyte in Shembaganur forest (1800 m.).

¹Bull. Brit. Mus. (nat. Hist.), 3 (6) : 262, 1965.

Family POLYPODIACEAE

Pyrrrosia mollis (Kze.) Ching ; Mehra & Bir 163, 1964.

Met with on rocks or as an epiphyte in Shembaganur forest (1900 m.) near Bear Shola falls (2100 m.) and near Silver Cascade (1800 m.). This fern is common between 1500-2000 m. altitude (4820, 4821, 5869, 5870).

P. lanceolata (L.) Farwell ; Mehra & Bir 161, 1964.

This low level fern is found below 1000 m. altitude and generally forms mats on rocks and walls between 500-900 m. altitude especially at Falls View (600 m.) and Cooly Ghat (700 m.). Occasionally it may grow as an epiphyte on the lower portions of tree trunks. (4826, 5871, 5872).

Paraleptochilus decurrens (Bl.) Copel. ; Mehra & Bir 166, 1964.

It is an extremely rare fern and was collected only once as growing on moist shaded rocks in forest near Pillar Rocks (2100 m.). It has characteristic dimorphic fronds. (4503).

Lepisorus nudus (Hook.) Ching ; Mehra & Bir 169, 1964.

Occasionally grows as an epiphyte or lithophyte in Shembaganur forest (1950 m.), along Tiger Shola road (1700 m.) and also near Moir Point (2300 m.). (4713-4715, 5868).

L. amaurolepida (Sledge) Bir & Trikha¹.

It grows on rocks or tree trunks in moist shaded situations in sholas near Moir Point (2100 m.), Pillar Rocks (2000 m.), Shembaganur (1950 m.) and Silver Cascade (1700 m.). (4776, 4777, 4825, 5866, 5867).

Pleopeltis macrocarpa (Bory ex Willd.) Kaulf². *Pleopeltis lanceolata* Kaulf. ; Bedd., Handb. 357, t. 197, 1883. *P. lepidota* (Willd. ex Schlecht.) Presl ; Bedd., F.S.I. 60, t. 181, 1864. (nom. illegit.).

A very rare epiphyte, collected only once as growing on a tree trunk from near Bear Shola (2100 m.). (5864, 5865).

Phymatodes hastata (Thunb.) Ching ; Mehra & Bir 170, 1964.

This fern is extremely rare and was collected only once as growing on tree trunk at damp shaded places in shola near Moir Point (2100 m.). (4817, 4818).

¹ Basynym : *Pleopeltis amaurolepida* Sledge in Bull. Brit. Mus. (nat. Hist.) 2 (5) : 136, 1960.

² For nomenclature and synonymy see Pichi-Sermolli (1965) and Bir and Trikha (1968).

P. montana (Sledge) Bir & Devi¹.; *Pleopeltis oxyloba* Bedd., F.S.I. 59, t. 175, 1864 pro parte; *Pleopeltis hastata* Bedd., Handb. 362, 1883 pro parte (non *Polypodium hastatum* Thunb.).

It is recorded from Kodaikanal by Bourne in May and June, 1898 from Bear Shola and Pillar Rocks stream respectively (cf. Sledge 1960), Sauliere in September 1913 from Shembaganur and Saldhna in September 1959 (without locality).

Colysis hemionitidea (Wall.) Presl; Mehra & Bir 173, 1964.

It is a lithophytic fern and grows in moist and shady situations near Pillar Rocks (2100 m.). (4819).

Microsorium membranaceum (Don) Ching; Mehra & Bir 175, 1964.

This rare fern was collected only once inside shola near Moir Point (1500 m.) as growing on the lower part of moist shaded tree trunk. (4822, 4824).

M. punctatum (Linn.) Copel.; Mehra & Bir 175, 1964.

This low level fern is very rare and was collected only once as growing on moist shaded rock in a khud *en route* Kodaikanal (600 m.). (4827).

Family GRAMMITIOACEAE

Ctenopteris subflacata (Bl.) Kunze; Mehra & Bir 176, 1964.

It grows at the basal portions of tree trunks in the forest near Shembaganur (1500 m.) and is very rare. (4778).

Recently Bhavanandan (1968) recorded *Dryopteris hirtipes* (Bl.) O. Ktze., *D. boryana* (Willd.) C. Chr. [= *Dryoathyrium boryanum* (Willd.) Ching], *Cyclosorus unitus* (L.) Ching and *Thelypteris paludosa* (Bl.) K. Iwatsuki from Kodaikanal but no specific localities are mentioned.

SUMMARY

The preceding account clearly indicates that Kodaikanal is very rich in members of Pteridophytes. Summary of recorded species from the area, belonging to different genera is on p. 194.

Amongst the genera very well represented at Kodaikanal mention may be made of *Lycopodium*, *Adiantum*, *Cyathea*, *Athyrium*, *Dryopteris*, *Diplazium*, *Thelypteris* and *Asplenium*. Eighteen species of the last mentioned genus are met with in the area.

¹ Bull. Bot. Surv. India 10 : 209, 1968.

Name of the genus	No. of species	Name of the genus	No. of species
FERN-ALLIES			
<i>Psilotum</i>	1	<i>Equisetum</i>	1
<i>Selaginella</i>	3	<i>Lycopodium</i>	9
FERNS			
<i>Ophioglossum</i>	1	<i>Botrychium</i>	2
<i>Marattia</i>	1	<i>Angiopteris</i>	1
<i>Osmunda</i>	1	<i>Lygodium</i>	1
<i>Adiantum</i>	6	<i>Vittaria</i>	1
<i>Antrophyum</i>	1	<i>Cheilanthes</i>	2
<i>Pellaea</i>	1	<i>Hemionitis</i>	1
<i>Pityrogramma</i>	1	<i>Pteris</i>	1
<i>Actiniopteris</i>	1	<i>Pteridium</i>	1
<i>Mecodium</i>	3	<i>Microlepia</i>	2
<i>Hypolepis</i>	1	<i>Lindsaya</i>	1
<i>Sphenomeris</i>	1	<i>Araiostegia</i>	1
<i>Lecostegia</i>	1	<i>Davallia</i>	1
<i>Nephrolepis</i>	2	<i>Oleandra</i>	1
<i>Dicranopteris</i>	1	<i>Cyathea</i>	4
<i>Polystichum</i>	3	<i>Arachnoides</i>	2
<i>Cyrtomium</i>	1	<i>Elaphoglossum</i>	3
<i>Dryopteris</i>	7	<i>Athyrium</i>	7
<i>Diplazium</i>	5		(one variety also)
		<i>Dryoathyrium</i>	1
<i>Thelypteris</i>	6	<i>Diplaziopsis</i>	1
<i>Cyclosorus</i>	5	<i>Ampelopteris</i>	1
<i>Asplenium</i>	18	<i>Leptogramme</i>	1
	(also one variety)		
		<i>Blechnum</i>	1
<i>Laxogramme</i>	2	<i>Pyrrosia</i>	2
<i>Paraleptochilus</i>	1	<i>Lepisorus</i>	2
<i>Pleopeltis</i>	1	<i>Phymatodes</i>	2
<i>Colysis</i>	1	<i>Microsorium</i>	2
<i>Ctenopteris</i>	1		

Total : FERN-ALLIES : Genera : 4 and Species : 14.

FERNS : Genera : 52, Species : 118 and varieties : 2 (120 different ferns)

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